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March 21, 2016

Ms. Kay Zias
Director of Environmental Remediation
City of New York, Parks & Recreation
Capital Projects Division
Olmsted Center
Flushing Meadows-Corona Park
Flushing, New York 11368

**RE: Geotechnical and Subsurface Investigation Scope of Work (Rev. 1)
Red Hook Ballfields 5 to 8
Brooklyn, NY
Parent Contract Registration No. MMA1 846 20166200181
EPIN No.: 84614P0001002
Project Registration No.: 20167201456
Project Contract No: B126-116M
TRC Project No. 246184**

Dear Ms. Zias:

The following is the planned scope of work for geotechnical and subsurface investigation services to be performed in connection with the referenced project. The objective of the geotechnical and subsurface scope of work is to provide data useful for the design of the synthetic turf field for Red Hook Ballfields 5 to 8, Brooklyn, New York (the "Site").

SCOPE OF WORK

Task 1 – HASP and QAPP

The soil and groundwater sampling will be performed in accordance with the Quality Assurance Project Plan (QAPP) dated March 2016 and the Site-Specific Health and Safety Plan (HASP) dated March 2016. The QAPP addresses each element of the sampling effort [i.e., soil, groundwater, and infiltration tests; field screening with a photoionization detector (PID); and all of the required analytical parameters].

Task 2 – Geotechnical Sampling

Historic geotechnical borings indicate that on-site groundwater is located from 8.5 to 10.5 feet below grade surface (bgs) and fill material is located to a depth of 15 to 17 feet bgs. The proposed geotechnical investigation will be implemented by TRC's geotechnical subcontractor Oweis Engineering, Inc. and will include the installation of 15 soil borings to approximately 20 feet bgs. TRC's proposed drilling subcontractor is Land Air Water Environmental Services, Inc. (LAWES). Standard penetration testing and continuous split spoon sampling will be performed to four (4) feet bgs with additional samples collected every five (5) feet until native material is encountered. Split spoons will be decontaminated between each sample where analytical analysis is to be performed. An engineering geologist, working under the direction of a professional engineer shall observe the performance of the soil borings to confirm conformance of the work to appropriate ASTM standards and New York City Building Code. The engineering geologist will log the samples to document the subsurface soil and groundwater conditions.

Particle-size and atterberg limit analyses will also be conducted on selected representative samples to assist in evaluation of the engineering properties of the soil and to confirm the field identification of the soils. The particle-size analyses will be performed in accordance with the procedures outlined in ASTM Standard D422 "Standard Test Method for Particle-Size Analysis of Soils". The atterberg limit analyses will be performed in accordance with the procedures outlined in ASTM Standard D4318.

Task 3 – Infiltration Tests

Infiltration tests will be performed to provide data useful for the design of green infrastructure to dissipate the anticipated increased stormwater runoff volumes. The proposed locations for the five (5) infiltration tests were selected to provide spatial coverage of the Site. TRC will complete five (5) soil borings to a depth that is one foot below the water table and conduct water infiltration tests. The infiltration tests will be performed in accordance with the NYCDEP Office of Green Infrastructure procedures dated December 2015.

Task 4 – Collection of Soil and Groundwater Samples from the Boreholes

Soil samples will be collected from the five (infiltration test) boreholes at 2 to 4 feet, 5 to 7 feet, and 8 to 10 feet (depending on how deep the water table is, assuring that the deepest



sample collected is within one foot above the water table). A groundwater sample will also be collected at each of the five (5) boreholes. The purpose of this sampling effort is to obtain background data that NYSDEC may request prior to approving the installation of green infrastructure that would allow water to infiltrate soils known to be contaminated with metal constituents. The fifteen (15) soil and five (5) groundwater samples will be analyzed for the following parameters. Soil and groundwater samples submitted for laboratory analysis will be analyzed for the parameters listed in 6 NYCRR Part 375-6.8(b), with the exception of VOCs. Analysis for VOCs will only be performed if PID readings indicate the presence of significant organic vapors. Specific criteria for soil sample selection and analysis for VOCs will be provided in the QAPP.

In addition to the metal parameters listed in Part 375-6.8(b) (including hexavalent chromium) the soil and groundwater samples will be analyzed for the additional metals on the USEPA Target Analyte List (TAL) (including aluminum, antimony, calcium, total chromium, iron, magnesium, potassium, sodium, thallium, vanadium, and tin). The following analytical methods will be used:

- Part 375 VOCs: EPA Method 8260C (as required)
- Part 375 SVOCs: EPA Method 8270D
- Part 375 Pesticides: EPA Method 8081B
- Part 375 Herbicides: EPA Method 8151
- TCL PCBs: EPA Method 8082A
- TAL Metals: EPA Method 6010C (and 7471B for mercury and 7196A for hexavalent chromium)
- Total Cyanide: EPA Method 9012B

Samples will be submitted for analysis on a standard laboratory turn-around time of 10-business days. Quality Assurance and Quality Control sampling, including field blanks, site-specific matrix spike and matrix-spike duplicates (MS/MSD), equipment blanks and blind duplicate samples will be collected at a rate of one per 20 samples for soil (one Duplicate, one Equipment Blank, one Matrix Spike, one Matrix Spike Duplicate) and groundwater (one Duplicate, one Equipment Blank, one Matrix Spike, one Matrix Spike Duplicate). NYSDEC Analytical Services Protocol (ASP) Category B/Level 4 analytical data packages will be provided by the laboratory. TRC will perform 100% validation of the data and prepare a Data Validation Report.

This task includes use of temporary 1-inch diameter PVC well screens for collection of groundwater samples, as well as purging of groundwater from each borehole prior to low-flow groundwater sample collection, and analysis of both field filtered (dissolved) and unfiltered (total) water samples for metals. TRC is proposing these measures to minimize suspended solids and obtain more representative groundwater samples for evaluating metals contaminant transport concerns. Wastewater generated from decontamination of sampling equipment will be collected and stored in the wastewater drum currently located on Ballfields 5-8 in a secured shed.

Following sample collection, a site-wide land survey will be performed. The ground surface elevation and global positioning system coordinates of each temporary groundwater monitoring well will be documented. The groundwater table surface will be referenced in feet below ground surface (bgs) and elevation in North American Vertical Datum of 1988 (NAVD 88).

Task 5 – Reporting

TRC will provide a geotechnical report signed and sealed by a NYS licensed professional engineer, including test results, boring logs, soil classification and profile, depth to groundwater and geotechnical recommendations. TRC will also provide a limited soil and groundwater sampling and infiltration testing report.

SCHEDULE

Upon approval, TRC will confirm the proposed schedule and confirm the utility mark-out. The work is tentatively scheduled for March 22 to March 28, 2016.



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Should you have any questions or comments, please contact me.

Sincerely,
TRC ENGINEERS, INC.



Wes D. Lindemuth, CHMM, CSP
Senior Project Manager

Attachment:

Figure 1 – Soil Boring Sample Location Plan

cc: J. Miranda, TRC
J. Peronto, TRC



FIGURE 1
SAMPLE LOCATION PLAN

